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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHANNIS JOSEPHUS DEN BOER,
ANTHONY THOMAS COLE, KLISTHENIS DIMITRIADIS
and DJURRE HANS ZIJSLING

Appeal 2008-003727
Application 10/621,823
Technology Center 3700

Decided: April 26, 2010

Before STEVEN D.A. McCARTHY, KEN B. BARRETT
and FRED A. SILVERBERG, *Administrative Patent Judges*.

McCARTHY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

- 1
2 The Appellants appeal under 35 U.S.C. § 134 from the Examiner's
3 decision finally rejecting claims 1, 2, 4, 6 and 9-14 under 35 U.S.C. § 103(a)
4 as being unpatentable over Moe '084 (US 4,736,084, issued Apr. 5, 1988)

and Liady (US 1,260,690, issued Mar. 26, 1918); finally rejecting claim 3 under § 103(a) as being unpatentable over Moe '084, Liady, Moyer (US 2,719,207, issued Sep. 27, 1955) and Rothschild (US 2,497,631, issued Feb. 14, 1950); finally rejecting claim 5 under § 103(a) as being unpatentable over Moe '084, Liady and Moe '413 (US 5,721,413, issued Feb. 24, 1998); and finally rejecting claims 7 and 8 under § 103(a) as being unpatentable over Moe '084, Liady and Hitz (US 2,998,646, issued Sep. 5, 1961). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Claim 1 is the sole independent claim on appeal:

1. A method of joining heavy duty tubulars, each of said tubulars having at least one circumferentially non-planar tubular end, the method comprising the step of:

joining the tubulars by forge welding and flushing a reducing flushing gas around the heated tubular ends during at least part of the forge welding operation.

ISSUES

The Appellants advance no contention regarding the patentability of dependent claims 2, 6, 9 and 12-14 separate from the Appellants' contentions directed against the rejection of claim 1. (*See, e.g.*, Br. 18). Therefore, the Appellants have argued claims 1, 2, 6, 9 and 12-14 as a group for purposes of the rejections of those claims under § 103(a). Claim 1 is representative of the group. *See* 37 C.F.R. § 41.37(c)(1)(vii). Neither do the Appellants advance any contentions regarding the patentability of claim 3 over Moe '084, Liady, Moyer and Rothschild; the patentability of claim 5

1 over Moe '084, Liady and Moe '413; or the patentability of claim 7 or claim
2 8 over Moe '084, Liady and Hitz, separate from the Appellants' contentions
3 regarding the rejection of claim 1.

4 The Examiner concludes that the subject matter of claim 1 would have
5 been obvious from the combined teachings of Moe '084 and Liady, finding
6 that Liady shows knowledge among those of ordinary skill in the art of the
7 use of circumferentially non-planar tubular ends in order to produce stronger
8 welds. (Ans. 4). The Appellants contend that the combination of the
9 teachings of Moe '084 and Liady proposed by the Examiner would not have
10 been obvious since Moe '084 does not teach a method suitable for heating
11 and welding the interlocking pipe ends disclosed by Liady (Br. 14) and since
12 Moe '084 teaches away from the proposed combination (Br. 15).

13 The Appellants contest the rejections of claim 4 and its dependent
14 claims 10 and 11 separately from the rejection of claim 1. (*See, e.g.*, Br. 19).
15 In other words, the Appellants have argued claims 4, 10 and 11 as a separate
16 group for purposes of the rejections of those claims under § 103(a). Claim 4
17 is representative of this separate group.

18 More specifically, Claim 4 depends from claim 1 and recites that "the
19 heavy duty tubular string is a casing-while-drilling string which carries a
20 drill bit while drilling the hole and which remains in the borehole after
21 completion of the drilling process." The Appellants contend that the
22 Examiner has not articulated any apparent reason why one of ordinary skill
23 in the art familiar with the combined teachings of Moe '084 and Liady might
24 have allowed the heavy duty tubular string formed by joining the heavy duty
25 tubulars to remain in a borehole after the completion of a drilling process.
26 (Br. 19).

Only issues and findings of fact contested by the Appellants have been considered. *See Ex Parte Frye*, 94 USPQ2d 1072, 1075-76 (BPAI 2010). This Appeal turns on two issues:

First, do the evidence and technical reasoning underlying the rejection of representative claim 1 adequately support the conclusion of obviousness?

Second, do the evidence and technical reasoning underlying the rejection of representative claim 4 adequately support the conclusion of obviousness?

FINDINGS OF FACT

The record supports the following findings of fact (“FF”) by a preponderance of the evidence.

1. Moe '084 describes a method for butt welding pipes. The method includes positioning the surfaces of the pipes which are to be welded so that the surfaces constitute a narrow gap; heating the pipes by means of high frequency current supplied from a power source; and then forge welding the pipes. (Moe '084, col. 1, ll. 8-14 and col. 3, ll. 3-35).

2. Moe '084 teaches that it is of great importance that the heating be concentrated as much as possible in the area of the joint in order to provide an efficient joining of the parts. (Moe '084, col. 1, ll. 21-23). Moe '084 discloses that, because the current follows the gap surfaces very accurately, the resistance heating takes place just at the desired locations. (Moe '084, col. 3, ll. 28-31). The reference teaches that the current follows the gap surfaces because the high frequency current follows the path of lowest total impedance rather than the path of least ohmic resistance. For

1 this reason, Moe '084 teaches positioning the gap surfaces close to each
2 other, but not in physical contact. (Moe '084, col. 2, ll. 30-37).

3 3. Moe '084 discloses using an alternative method for welding
4 rods or bolts. In the similar method, the gap surfaces of the rods or bolts to
5 be joined are given somewhat curved shapes. The reference states that the
6 high frequency current applied in the alternative method will not follow the
7 shortest path across the curved gap between the contacts, but will spread out
8 over the gap surfaces for more even heating. (Moe '084, col. 3, ll. 44-53).

9 4. Moe '084 teaches that, because the curved surfaces of the rods
10 or bolts used in the alternative method are curved in opposite directions, the
11 surfaces provide favorable guidance of the elements when the elements are
12 pressed together to form a welding joint. (Moe '084, col. 4, ll. 1-4).

13 5. Liady discloses a method for welding a new threaded end or
14 fitting onto a pipe length for use in forming a drill-pipe. (Liady 1, ll. 24-38
15 and 98-107).

16 6. Liady's method includes scalloping the end surfaces of the pipe
17 length 10 and the fitting 12 which are to be welded so as to form mating
18 teeth 14, 15. (Liady 1, ll. 39-45). Liady teaches that scalloping mating ends
19 of a pipe length 10 and a fitting 12 provides a welding surface larger than the
20 welding surface provided by circumferentially planar ends. Liady also
21 teaches that the scalloping permits the teeth 14, 15 to interlock. (Liady 1, ll.
22 50-56). One of ordinary skill in the art would have recognized that the
23 increased welding surface increased weld strength while the interlocking
24 teeth increased the resistance of the weld to applied torque.

25 7. Liady discloses welding the ends of the pipe length 10 and the
26 fitting 12 by an oxy-acetylene process. (Liady 1, ll. 81-86).

PRINCIPLES OF LAW

A reference teaches away from the subject matter of a claim only if “a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Prior art does not teach away from claimed subject matter merely by disclosing a different solution to a similar problem unless the prior art also criticizes, discredits or otherwise discourages the solution claimed. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

ANALYSIS

First Issue

Liady teaches that scalloping mating ends of a pipe length 10 and a fitting 12 increases the weld surface and permits the teeth 14, 15 to interlock, thereby strengthening the weld. (FF 6). As the Examiner correctly reasons (*see* Ans. 4 and 6), this recognition would have provided one of ordinary skill in the art reason to increase the welding surface of a weld produced by the method of Moe '084 by joining pipe ends having mating, circumferentially non-planar surfaces. In addition, Moe '084 teaches providing the ends of two objects to be forge welded with curved, that is, non-planar, surfaces to provide favorable guidance when the objects are pressed together to form the welding joint. (FF 3 and 4). This teaching would have provided an additional reason for one of ordinary skill in the art to provide two pipe ends to be welded by the method of Moe '084 with circumferentially non-planar surfaces.

1 In order to establish a legal conclusion of obviousness, the Examiner
2 need not show that embodiments disclosed by Moe '084 and Liady are
3 physically combinable. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).
4 In particular, the Examiner need not show that one of ordinary skill in the art
5 would attempt to practice the forge welding method described by Moe '084
6 on pipe ends having scalloped surfaces as depicted in the drawing figures of
7 Liady. In combining the teachings of Moe '084 and Liady, one of ordinary
8 skill in the art would have practiced some limited degree of creativity in
9 modifying particular structures described in the references to produce an
10 operable welding process. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398,
11 418 (2007)("[A] court can take account of the inferences and creative steps
12 that a person of ordinary skill in the art would employ.").

13 As the Appellants contend (*see* Br. 14-16), the teachings of Moe '084
14 might have discouraged one of ordinary skill in the art from applying the
15 method of Moe '084 to pipes having the particular scalloped end surface
16 configurations depicted in the drawing figures of Liady. Nevertheless, as the
17 Examiner reasons (*see* Ans. 6), the combined teachings of Moe '084 and
18 Liady would have provided an apparent reason to apply the welding method
19 of Moe '084 to pipes having gently non-planar surfaces. One of ordinary
20 skill in the art would have recognized from the teachings of Liady that even
21 gentle circumferential non-planarity would have increased the welding
22 surface beyond the welding surface provided by circumferentially planar
23 pipe ends as well as provided a degree of interlock of the pipe end surfaces
24 capable of improving the resistance of the weld to torque.

25 On the other hand, the operability of the alternative method disclosed
26 by Moe '084 for welding rods or bolts with curved end surfaces (*see* FF 3)

1 would have provided one of ordinary skill in the art a reasonable expectation
2 that the method disclosed by Moe '084 would succeed in satisfactorily
3 welding pipes with gently circumferentially non-planar end surfaces, even if
4 the current distribution and heating were not optimal in accordance with the
5 teachings of Moe '084 (*cf.* FF 2 and 3 (summarizing teachings of Moe '084
6 regarding current distribution and heat flow)). Since the teachings of Moe
7 '084 would not have discouraged one of ordinary skill in the art from
8 applying the welding method of Moe '084 to pipes having gently
9 circumferentially non-planar surfaces, but instead would have provided
10 reason to do so, Moe '084 does not teach away from the subject matter of
11 representative claim 1.

12
13 *Second Issue*

14 Liady discloses a method for welding a new threaded end or fitting
15 onto a pipe length for use in forming a drill-pipe. (FF 5). One of ordinary
16 skill in the art familiar with the teachings of Liady would have recognized
17 that welding in general was a suitable technique for joining pipes for use in a
18 drill string. Even though Liady discloses welding the ends of a pipe length
19 10 and a fitting 12 rather than the ends of two tubulars, one of ordinary skill
20 in the art familiar with the disclosure of Liady would have recognized that a
21 welded joint had sufficient strength for use in a drill string.

22 The method of Moe '084 is similar to the method of Liady in the sense
23 that both methods include joining ends of pipes or pipe-shaped structures by
24 welding. It would have been obvious to improve Liady's method by
25 substituting forge welding in accordance with the method described by Moe
26 '084 for the oxy-acetylene process disclosed by Liady in order to take

1 advantage of the selective heating and improved weld strength available
2 from the method of Moe '084. At the same time, it would have been obvious
3 from the combined teachings of Moe '084 and Liady to provide the ends of
4 the tubulars to be welded with gently circumferentially non-planar end
5 surfaces for the reasons discussed already. The Appellants provide no
6 evidence or convincing argument that any of these modifications would have
7 been beyond the level of ordinary skill in the art or that any of these
8 modifications would have produced results not predictable from the
9 teachings of Moe '084 and Liady.

10 Representative claim 4 recites that the “heavy duty tubular string,”
11 which for purposes of this appeal only we interpret as being a tubular string
12 including tubulars joined by the method of claim 1, is a casing-while drilling
13 string. The Appellants point to no persuasive distinction between a casing-
14 while-drilling string and the drill-pipe discussed by Liady which might
15 imply that a drill string prepared using a welding or joining method obvious
16 from the teachings of Moe '084 and Liady would not be susceptible of use as
17 a casing-while-drilling string. Neither do the Appellants persuasively
18 explain how the recitation that the heavy duty tubular string is a casing-
19 while-drilling string further limits the single method step recited in parent
20 claim 1 so as to exclude a welding or joining method obvious from the
21 teachings of Moe '084 and Liady.

22 For this reason, the Examiner is correct in concluding that the
23 recitation that the heavy duty tubular string is a casing-while-drilling string
24 does not limit the method of claim 4 in a patentable manner. Since the
25 recitation that the casing-while-drilling string “carries a drill bit while
26 drilling the hole and . . . remains in the borehole after completion of the

1 drilling process” describes or defines a casing-while-drilling string instead of
2 limiting the sole method step incorporated into claim 4, these recitations also
3 do not patentably distinguish the subject matter of representative claim 4.

4
5 CONCLUSIONS

6 The evidence and technical reasoning underlying the rejection of
7 representative claim 1 adequately support the conclusion of obviousness.

8 The evidence and technical reasoning underlying the rejection of
9 representative claim 4 also adequately support the conclusion of
10 obviousness.

11 We sustain the rejection of claims 1, 2, 4, 6 and 9-14 under § 103(a)
12 as being unpatentable over Moe '084 and Liady.

13 Since the Appellants do not advance any contentions regarding the
14 rejection of claim 3 under § 103(a) as being unpatentable over Moe '084,
15 Liady, Moyer and Rothschild; the rejection of claim 5 under § 103(a) as
16 being unpatentable over Moe '084, Liady and Moe '413; or the rejection of
17 claim 7 or claim 8 under § 103(a) as being unpatentable over Moe '084,
18 Liady and Hitz separate from the Appellants' contentions regarding the
19 rejection of claim 1, we sustain the rejections of claims 3, 5, 7 and 8 as well.

20
21 DECISION

22 We AFFIRM the Examiner's decision rejecting claims 1-14.

23 No time period for taking any subsequent action in connection with
24 this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R.
25 § 1.136(a)(1)(iv) (2007).

AFFIRMED

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13 SHELL OIL COMPANY

14 P O BOX 2463

15 HOUSTON, TX 77252-2463